PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

1.2 SUMMARY

A. Provide labor, materials, and equipment necessary for providing the preformed metal roofing and related Work as indicated and required for a complete and watertight installation.

B. Items provided under this Section includes, but is not limited to:
   1. Metal roofing and fascia.
   2. Flashings, closures, and cap trim.
   3. Metal gutters and downspouts.
   4. Vent roof jacks and mechanical curbs.
   5. Clips, accessories, and fasteners.
   6. Sealants for components under this Section.
   7. Membrane flashing.
   8. Roof curbs.

1.3 REFERENCES

A. ASCE 7 – Minimum Design Loads for Buildings and other Structures
B. ASTM B32 – Standard Specification for Solder Metal
D. ASTM D2178 – Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing
F. FED A-A-51145 – Flux, Soldering, Non-Electronic, Paste and Liquid
H. SMACNA – Architectural Sheet Metal Manual
I. AA (Aluminum Association) - Designation System for Aluminum Finishes
K. NAAMMM – Metal Finishes Manual for Architectural and Metal Products
N. ASTM D1730 – Preparation of Aluminum and Aluminum Alloy Surfaces for Painting
P. FBC – Florida Building Code
1.4 SYSTEM DESCRIPTION

A. Panel shall be designed in accordance with sound engineering methods and practices and in accordance with SMACNA, AAMA, and NRCA standards.

B. Roof structure shall be designed with proper recognition for the "floating system" which must exist to have a roof panel that meets expansion and contraction requirements.

C. Damaged panel replacement shall not require the use of through the roof fasteners.

D. Roof system shall have Underwriters Laboratories UL-90 wind uplift classification and comply with ANSI 58.1, and all applicable codes or applicable standard based on rating required. See structural drawings.
   1. The installation shall be designed to safely resist the positive and negative loads, as specified in the structural drawings.

1.5 SUBMITTALS

A. Product Data: Include manufacturer’s product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.

B. Shop drawings shall show profile and gauge of items, location and type of fasteners; location, gauge, shape, and method of attachment of trim; and other details as may be required for a weathertight installation.
   1. Do not proceed with manufacture prior to review of shop drawings. Do not use Drawings prepared by Architect for shop or erection drawings.
   2. Shop drawings shall show methods of erection, elevations, and plans of roof panels, sections and details, anticipated loads, flashings, roof curbs, vents, sealants, interfaces with materials not supplied, and proposed identification of component parts and their finishes.
   3. Shop drawings shall be prepared by metal roof manufacturer and signed and sealed by an Engineer registered in the State of Florida. Contractor prepared shop drawings are not acceptable.
   4. Shop drawings shall be signed, sealed, and dated by a Professional Engineer registered in Florida.
   5. Fasteners, Clips: Design as per ASTM E1592-94

C. If installation is to be performed by licensed agent or subcontractor of the roofing system manufacturer, manufacturer shall submit prior to bidding certification or proof of its licensing or approval of the proposed installer, and testimonial statement of the qualifications of the proposed installer, affirming that the proposed installer is thoroughly familiar with the specified system, and has successfully performed similar installations on comparable projects within the State of Florida in the last five years; a list of such projects shall be attached. The manufacturer shall also submit an outline of additional supervisory, inspection, or other on-site services that it intends to provide.

D. If the installation is to be performed by the manufacturer’s own personnel or with sublet labor working in the manufacturer’s name, the manufacturer shall submit a qualifications statement naming its jobsite supervisor or foremen certifying his familiarity and “on the job” experience with the specified system, and listing comparable Florida projects in which the specified system was installed under his supervision in recent years.
E. Include engineering calculations, where applicable, or if requested by Owner, or other authority having jurisdiction. Shop drawings and engineering calculations shall be signed and sealed by a State of Florida Professional Engineer, who shall certify that the submitted roofing system meets wind uplift and other loading criteria and other structural requirements, as specified in this Section or as required by referenced building codes and standards.

F. Submit manufacturer’s complete standard color samples, as part of the submittal package.
   1. Submit two samples, 12 inch square, of exposed finish material, all roof fastening accessories, of selected color.

G. Submit SBCCI certificate of compliance report.

H. Submit sample of warranty/guarantee form or statement of warranty/guarantee conditions and qualifications.

I. The Contractor and subcontractor shall submit certification that all materials, installation complies with all Contract Documents Requirements.

J. Provide roofing compliance certification. Submittals without this form shall not be reviewed and deemed incomplete.

K. Submit certification verifying that metal roofing system is tested and approved to meet the requirements of ASCE 7.

L. Submit fall protection plan/system for use both during construction and Owners use after construction for roof repair, meeting OSHA requirements.
   1. Provide for a permanent tie-off system.

1.6 QUALITY ASSURANCE

A. Manufacturer's qualifications:
   1. Manufacturer shall have a minimum of 10 years experience in manufacturing panels of this nature, in a permanent, stationary, indoor production facility.

B. The installer shall have been actively installing the type of roofing system defined in these Specifications for a minimum of 5 years and be approved by the manufacturer of the system being installed.
   1. Installer Certification: Obtain written certification from manufacturer of preformed metal roofing system certifying that Installer is approved by manufacturer to install specified roof system. Provide a copy of certification to Architect prior to starting Work.
   2. Installation company or entity shall have a minimum of five years continuous independent, direct experience under its same current business name or legal entity, installing metal roofing of same type as specified in this Section. Installer shall have current active, Roofing Contractor’s certification/registration, in good standing, with the State of Florida Department of Professional Regulation, Construction Industry Licensing Board, for the classes of Work specified in this Section.
   3. Requirements of Regulatory Agencies – comply with the State Uniform Codes for Public Educational Facilities construction and all other applicable codes and ordinances. Obtain permits, arrange for inspection, tests required in presence of authorized representatives.
   4. Field roll forming of roof panels shall be performed by the manufacturers on crew.

C. Design: The preformed metal roof system shall be designed to sustain the specified loads in accordance with drawings and governing building codes in the county and state, which this Project is located in. Components of the preformed metal roof system shall meet the design loads and applied in load combinations as specified in governing building codes, without exceeding the allowable working stresses.
D. When tested in accordance with ASTM E283 and ASTM E331, the panel assembly shall show no more than 0.01 cfm/ft² of air infiltration at 6.24 psf test pressure and no water leakage at 15 psf test pressure for 15 minutes with a volume spray of 5 gallons per hour.

E. Structural: Uniform load capacity shall be determined by testing in accord with the principles of ASTM E330 adapted to testing of formed sheet panels by clarifying specific sections of this standard as follows:
1. Roof test specimens shall be representative of the main body of the roof, free from influence of perimeter conditions. The setup shall be continuous over one or more supports and contain at least 5 panel widths.
2. No roof attachments are permitted at the sides other than the standard gable or rake condition. For uplift tests, at least one end seal shall be flexible and in no way restrain the crosswise distortion of panels. One end may simulate an eave condition if at least 12 feet away from the mid-roof clip under evaluation.
3. Roofing panels and accessories shall be production material of the same type and thickness proposed for use on the project.
4. Longitudinal seals or plastic film shall not span any crevice or cracks that may tend to separate under pressure (e.g. plastic films used to seal the chamber must be applied into the side seam of the panel so as to apply a uniform static pressure to the entire cross section of the panel).
5. Design capacity for conditions of gauge, span or loading other than those tested may be determined by the interpolation of test results in accord with the AISI Cold Formed Steel Manual. Extrapolation outside the range of the tests is not acceptable. The system as installed, shall carry an Underwriters Wind Uplift Class 90 rating in addition to and not in lieu of other performance criteria set forth by this specification.

F. Weathertightness: When tested in accord with the principles of NAAM TM-1, the roof system without sealant in the ribs shall show no leakage when exposed to dynamic rain and wind velocity up to 70 mph for 5 minutes.

G. Thermal Cycle Test: An assembly consisting of clips, 3 or more panels in width, and spanning 3 or more supports with clips positively loaded to 10 pounds shall resist 100,000 thermal cycles and show no visible signs of wear from the exterior and erode no more than 25 percent of the panel or clip material from the underside (nonexposed surfaces).

H. Except as otherwise indicated, the workmanship of field or shop formed sheet metal work, method for forming joints, anchoring, cleating and provisions for expansion shall conform to the standard details and recommendations of the "Architectural Sheet Metal Manual" published by SMACNA; and workmanship shall be of the best quality, in accordance with best trade practice and the recommendations and specifications of the Sheet Metal and Air Conditioning Contractors National Association, Inc., AAMA, and NRCA standards.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver panels to jobsite properly packaged to provide against transportation damage.
B. Handling: Exercise extreme care in unloading, storing, and erecting panels to prevent banding, warping, twisting, and surface damage.
C. Storage: Store materials and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation to panels to prevent condensation build-up between panels.

1.8 PROJECT CONDITIONS
A. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying work.

B. Preroofing Conditions

1. Prior to the installation of the roofing and associated work, meet at the project site with the installer, the installer of each component of associated work, the installers of deck or substrate construction to receive roofing work, the installers of other work in and around roofing that must follow the roofing work (including Mechanical Work), the Architect, and other representatives directly concerned with performance of the Work, including (where applicable) insurers, test agencies, product manufacturers, governing authorities, and the Owner. Record (by Contractor) the discussions of the conference and the decisions and agreements (or disagreements) reached and furnish a copy of the record to each party attending. Review foreseeable methods and procedures related to the roofing work including, but not necessarily limited to, the following:
   a. Review project requirements (Drawings, Specifications, and other Contract Documents).
   b. Review required submittals, both completed and yet to be completed.
   c. Review status of substrate work (not by the Metal Roofing Installer), including drying, structural loading limitations, and similar considerations.
   d. Review required observation, testing, certifying, and accounting procedures.
   e. Review regulations concerning code compliance, environmental protection, health, safety, fire, and similar considerations.
   f. Consider each party's extant judgment, as advanced in the interest of successful completion of the Work.
   g. Coordination shall be performed with other trades to provide that all roof penetrations occur in the center of a panel and so as not to allow a penetration or any flashing boot to fall on a seam.

C. Field Constructed Mock-Ups

1. The first 20 panels installed shall serve as a mock-up for Architect's approval of appearance, including the extent and intensity of "oil-canning" appearing in the panels. The sample area, when accepted, shall become the project standard for appearance including extent and intensity of oil-canning.

2. Metal roof areas not meeting project standard shall be removed and new panels installed including necessary corrective work to substrate to achieve acceptable project appearance standard at no additional cost to Owner.

1.9 WARRANTY

A. The Contractor shall furnish to the Owner a “No Dollar Limit Watertight Labor and Material Guarantee,” in writing, covering the roofing and flashing work including the installation of products furnished by others and installed under this Section of the Work, against defects in materials and workmanship for a period of 3 years. Guarantees are not intended to serve as protection against poor workmanship or inferior or improper materials at the time the roof is installed, but are for the purpose of protecting the Owner against future failures during the intended life of the roof covering.

B. The manufacturer for the preformed metal roofing shall also furnish to the Owner a written guarantee covering the finish of all roof related exposed coated metal surfaces against blistering, peeling, cracking, flaking, checking, rusting, excessive chalking, color change, corrosion, and structural failure for a period of 20 years.
1. Twenty year coating warranty. Warrant the following:
   a. Color change NMT 5NBS units.
   b. Chalk NMT No. 8.
   c. Blisters not to exceed No. 6.
   d. Coating shall not crack, peel, or lose adhesion, Kynar 500 (70 percent resin content).
2. Also provide a manufacturer's 20 year weathertightness warranty including, but not limited to, the following:
   a. Warranty shall include, but not be limited to, installation, preformed metal roofing, fascias, roof penetrations, flashings, cap flashings, closures and trims, fascia, expansion joints, fasteners, accessories and sealants.

C. The guarantee from the Preformed Metal Roofing Contractor shall be on the form shown at the end of this Section. Copies of this form will be furnished to the successful bidder by the Architect. The guarantee shall be submitted through the Architect to the Owner.

D. Guarantee shall include, but not be limited to, preformed metal roofing, fascias, roof insulations, flashings, cap flashings, closures and trims, fascia, expansion joints, fasteners, accessories, sealants, gutters, and watertight connection to downspouts.

E. Guarantee/warranty period shall begin on the date of Substantial Completion for the Project or such date that the roof is accepted by the Architect and Owner and shall provide for full cost of repair/replacement, etc., including installation.

F. Repairs required, either permanent or temporary, to preformed metal roofing or roof flashings under this guarantee to keep the roof watertight shall be started within 3 days after notice of the need for repairs. Should the Contractor fail to make such repairs within a reasonable time period, the Owner may have such repairs made and charge the cost to the Contractor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Products of the following metal roof panel manufacturers will be considered, providing their products equal or exceed the quality specified; and they can provide products of the type, size, function, and arrangement required:
   1. ZIP-RIB, Merchant and Evans, Inc., Burlington, New Jersey.
   2. Fabral/Alcan Building Products.
   3. Imetco
   4. Bemo USA, 4406 Gramary Avenue, Tampa, Florida

B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect’s approval and complete technical data for evaluation must be received at least 14 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 MATERIALS

A. Panel material: .040 inch minimum thickness equal to 3105-H14 Aluminum Alloy Smooth, produced in accordance with ASTM B209, 12 inches wide with minimum 2 inch high seams.

B. Exposed Finish: Apply the following organic coating in thickness indicated. Furnish appropriate air-drying spray finish in matching color for touchup.
1. Fluoropolymer Two-Coat Coating System: Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight with total dry film thickness of 0.9 mil and 15 percent reflective low gloss when tested according to ASTM A523.
   a. Durability: Provide coating field tested under normal range of weather conditions for a minimum of 2 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of a chalk rating of 8 according to ASTM D4214; and without fading in excess of 5 Hunter units.
   b. Color: As selected by Architect from manufacturer's full range of colors.

2.3 ROOF PANEL ASSEMBLIES

A. Prefomed metal roofing shall be minimum 2 inches high, vertical leg field crimped, standing seam panels with concealed fasteners.
B. Panels shall be fabricated in full lengths from ridge to eave without end laps. Panels shall be 16 inches wide maximum with concealed anchors that resist wind uplift yet permit expansion and contraction with temperature changes. Standing ribs 2 inches high minimum shall have a continuous groove capillary break. Ribs shall be securely locked over anchor clips with an electrically driven, field operated, roll forming tool. Site-formed panels will be allowed only for those panels over Federal Department of Transportation allowable shipping length. Roll forming of panels at the jobsite must be performed with manufacturer owned and relocatable industrial type rolling mill having a minimum of twelve stands to gradually shape the sheet metal. Individual panels shall be removable for replacement of damaged material.
C. Concealed clips shall be not less than 20 gauge nonmagnetic stainless steel. Clip design is to be such that it will accommodate expansion and contraction requirements while being anchored securely to structure. Two piece clips are not acceptable.
D. Concealed fasteners shall be self drilling, self tapping minimum 1/4" diameter screws with corrosion resistant coating designed and reviewed by system manufacturer to meet structural loading requirements. Gable anchor clips shall be aluminum alloy 6061-T6 minimum thickness .090 inch.
E. Roofing panels shall be manufactured in continuous lengths to eliminate perpendicular panel end laps.
F. Metal sheets or coils selected for forming into panels must be cut to size before receipt of finish coating or have cut edges specially coated with similar film of same applied finish after being sized. Actual finish and coating method intended for provision must appear on submitted shop drawings.

2.4 ROOFING SYSTEM ACCESSORIES

A. Sheet Metal and Flashings
   1. Fascia, eaves, rake trim, ridge caps, hip cap, water diverters, curbs and other sheet metal work shall be furnished in same materials, gauge and finish as roof panel, matching the roof panel finish. Gutters and downspouts shall be .064” aluminum to match roof panel thickness. Unexposed sides and edges shall be standard baked-on finish. Form to configuration indicated.
2. Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA “Architectural Sheet Metal Manual” and other recognized industry practices. Fabricate for waterproof and weather resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
   a. Minimum length of fascia and other preformed sheet metal shall be 10 foot lengths with concealed splice plate for joints.
   b. Provide gutter minimum 8-gauge aluminum support bracket of 3/16” thick by 1” wide aluminum with finish to match gutter and provide support angle bracket of 3/16” thick by 3” wide aluminum with finish to match gutter.
   c. Provide gutter minimum 8-gauge aluminum brackets and straps in accordance with Table 1-8, SMACNA, Architectural Sheet Metal Manual, 5th Edition spaced at maximum 3'-0” o.c.
   d. Unless indicated otherwise, fabricate downspout to meet Fig. 1-32B, SMACNA, Architectural Sheet Metal Manual, 5th Edition.
      i. Provide elbows, fittings, adapters, and brackets as indicated and as required for connection between collection box/scuppers/gutter outlets and drain boots.
   e. Form gutters in sections as long as possible, but not less than 8’ in length complete with end pieces, outlet tubes, and special pieces as required.
   f. Unless otherwise indicated, provide expansion joint with cover plate where indicated but no more than 50’ between expansion joints.
   g. Provide standard aluminum wire ball strainers at each outlet.
   h. All strap edges shall be rolled or smooth.
   i. Downspout size and configuration shall be as indicated on drawings and if not shown shall be minimum 4” x 4” or 4” diameter as indicated by Architect and at locations shown on the drawings.

B. Sealant: The standard of quality shall be that of a reputable and established sealant manufacturer, approved by the manufacturer of the metal roofing in which the sealant is used. Sealants shall have good cohesion as well as good adhesion to the protective coated metal and shall not be corrosive to components on which it is applied. Each shall have adequate handling characteristics during normal ranges of construction or erection temperatures. The sealant shall be one that will retain its weather sealing properties under the conditions for which it is used and each (sealant) is recommended for only the applications listed hereafter.
1. Extrudable sealant, nonmigratory, nondrying, and nonskinning synthetic elastomer base material conforming to the National Association of Architectural Metal Manufacturer's NAAMM Standard SS-1a-68, and, except for the "tack free time", shall conform to the performance requirements of Federal Specification TTC-598-b Type 1. Use at the following locations:
   a. Factory applied sealant in longitudinal ribs of standing seam roof panels.
   b. Spot sealing laps (where applicable) of standing seam roof panels.
   c. Sealing ridge cover and miscellaneous flashing.
   d. Sealing curbs for roof accessories.
2. Extruded butyl material conforming to performance requirements of Military Specification MIL-C-18969B Type II Class B. With the exception of the "compression set" requirement, it shall also conform to the National Association of Architectural Metal Manufacturer's NAAMM Standard #SS-1b-68 Class A for nonskinning resilient preformed compounds. Size of tape shall be that recommended by the building manufacturer. Use at the following locations:
   a. Sealing swaged end laps of standing seam roof panels.
3. Extrudable sealant, nondrying (but skinning) and nonmigratory synthetic elastomer base material, conforming to the performance requirements of Federal Specification TT-C-598-b Type 1. Use at the following locations:
   a. Sealing ridge channels
   b. Sealing exposed seams, butts, and laps at roof curbs
C. Prefabricated Metal Roof Curbs
   1. Fabrication of the prefabricated metal roof curbs shall be seamed in type and furnished by the same manufacturer as the roof covering sheets to assure an exact match with roof configuration. Metal gauge shall equal or exceed the following: Cricket metal - 24 gauge; curb metal - 14 gauge. The finish for both the cricket and curb metal shall be equal or exceed the roof covering sheet. Component connections between the prefabricated metal roof curbs, cricket, and base sheet shall be continuous welded to obtain watertight connections. Exposed surfaces shall match the color finish of the roof sheets.
D. Pipe Flashings
   1. Provide EPDM (ethylene propylene diene monomer) rubber flashings for vent pipe penetrations in metal roof. Provide clamping rings, sealant, and fasteners as recommended by manufacturer.
E. Membrane Flashing and Roofing Underlayment: Polyethylene-sheet-backed rubberized asphalt membrane, 40 mils thick.
   1. Provide one of the following products as recommended by shingle manufacturer:
      a. Celo-Guard; Celotex Corp., Tampa, Florida
      b. Ice and Water Shield; W.R. Grace Co., Cambridge, Massachusetts
      c. Moisture Guard; Tamko Roofing Products, Joplin, Missouri
F. Downspout Transition Leaders:
   1. Downspout transition leaders shall be manufactured by Neenah Foundry Company, Neenah, Wisconsin or equal as approved by Architect.
   2. Cast iron type “B” offset downspout transition leader with rectangular opening at top to match downspout and round opening at bottom to match drainage pipe.
   3. Downspout transition leader shall be finished to match downspout.
G. Substrate:
   1. Substrate shall be AC Foam Nail Base 3 ½” thick as manufactured by Atlas Roofing Corp. secured to metal deck as required to conform to ASCE 7 wind loading.

2.5 SHEET METAL ACCESSORIES

A. General: Unless otherwise indicated, provide accessories of same material as roofing system.
   1. Fasteners:
      a. Design all fasteners to withstand a wind uplift load to meet ACSE 7.
   2. Sealant, install in accordance with manufacturer's written recommendations.
   3. Bedding Compound, install in accordance with manufacturer's recommendations.

PART 3 EXECUTION
3.1 EXAMINATION

A. Areas on which insulation and metal roofing is to be installed shall be completely secured and free of dirt and debris.
B. This Contractor shall give written notice to the Architect of defects in substrate that would be detrimental to metal roofing installation prior to start of Work.
C. Start of insulation and metal roofing installation shall constitute acceptance of substrates by this Contractor.

3.2 METAL ROOFING INSTALLATION

A. Examination
   1. Areas on which insulation, moisture barrier and metal roofing is to be installed shall be completely secured and free of dirt and debris.
   2. The Contractor shall give written notice to the Architect of defects in substrate that would be detrimental to metal roofing installation prior to start of Work.
   3. Start of insulation, moisture barrier and metal roofing installation shall constitute acceptance of substrates by this Contractor.
B. Install roofing underlayment as a fully adhered system in accordance with manufacturer specifications over entire roof area.
C. Erection of the preformed metal roofing system shall be performed in accordance with the manufacturer's erection drawings.
D. Set bearing plates on surface of insulation board at standing clip angle locations.
E. Install concealed clips with self threading screws into concrete roof deck below. Size and length of screws and bearing plates shall be as recommended by manufacturer. Shim clips as required to provide a level installation with non-deteriorating shims.
F. Interlocking ribs shall be crimped together by an electric powered mechanical device in accordance with the roof manufacturer's instructions, immediately after securing in place.
G. Preformed metal roofing, fascia, gutter and other preformed sheet metal work shall be watertight and weathertight, lines and angles sharp and true, plain surfaces free from waves and buckles. Workmen shall be experienced in the trade and thoroughly capable of performing the Work in accordance with these requirements.
   1. Comply with manufacturer’s installation instructions and with SMACNA “Architectural Sheet Metal Manual”.
   2. Provide gutter brackets and straps maximum 36 inches on center, unless indicated otherwise.
   3. For nonmoving gutter seams, clean and tin edges, lap and solder. Touch up seams with paint matching prefinished metal as required. Install as indicated and in accordance with shop drawings with straps, hangers, and fasteners. Provide expansion joints between downspouts.
   4. Provide premanufactured outlet tube sections extending 3 inches into downspouts. Provide in each outlet tube a 14 B&S gauge stainless steel wire strainer of the removable basket type. Fit strainer snugly into outlets.
   5. Fasten downspouts to walls with straps and secure with stainless steel masonry screws. Extend downspouts into cast iron drains and seal with grout.
H. Fasteners are to be concealed.
I. Brake formed cap, trim, closure, flashing sections, and other sheet metal work are to be furnished with a minimum of joints.
1. Brake formed members with exposed corner intersections shall have corner pieces shop fabricated. Other miscellaneous trim corners may be field cut, mitered, or butted.  
2. Trim shall be of the same material as, and have a finish to match, the metal roofing panels.  
3. Minimum length of brake formed sheet metal and flashings shall be 10 feet with concealed splice plates for joints.  

J. Install roof jacks at pipe penetrations in metal roofing and roof curbs at all roof mounted equipment indicated. Provide required fastened, foam rods, plastic cement, and other sealant or material to provide watertight and weathertight construction.  

K. Install panels and accessories in strict accordance with the panel manufacturer's written instructions and the approved shop drawings. Use electrically driven "crimper tool" for closing seams wherever possible. Attach panels to framing members per the manufacturer's written instructions, providing fixed anchorage or allowing thermal movement where specified on shop drawings.  

L. Use appropriate clips, fasteners, braces, and anchors as indicated and any other items required for a complete installation and as recommended by manufacturer.  

M. Make repairs and perform additional work necessary to provide a roof watertight and acceptable to the Architect prior to start of roofing guarantee.  

N. Roof panels shall be able to support walking loads without excessive distortion or telegraphing of the structural supports. For the maximum span used on the project, panels shall withstand a 250 pound concentrated load applied to a 4 square inch pad located at the center of the panel flat without buckling of the rib or noticeable permanent distortion of the panel.  

O. Roof panel and flashing attachments shall be designed to accommodate the thermal expansion and contraction of the exterior material through a total of 100 degrees F. temperature change.  

P. Factors of safety on design loads to ultimate strength of fasteners shall be as stated in the industry standard for the material into which the fastener is driven.  
1. Aluminum Association for aluminum  
2. Allowable holding power for concrete shall be as specified in the building code for the product and grade of concrete involved.  

3. FIELD QUALITY CONTROL  

A. Prior to starting metal roofing work survey structure to determine if out of plane tolerances are within metal roofing manufacturer's tolerance. Notify Architect of structure that is outside allowable metal roofing manufacturer's tolerance.  
1. Starting metal roofing work constitutes acceptance of structure.  

B. Metal roof manufacturer shall provide a technical representative to perform inspections at each of the phases of completion indicated below. A report shall be submitted to Architect, Contractor, and Roofing Installer within 5 days after each inspection. Report shall indicate at a minimum, defects in the installation and resolutions to correct defects, additional instructions or training given to roofing installer, outstanding defects not corrected from previous inspections. Technical representative shall make a minimum of 3 site visits, including:  
1. Pre-installation conference.  
2. At 50 percent completion of metal roof system.  
3. At final completion of metal roof system. Technical representative shall prepare punch list at final completion prior to issuing warranty.  

3.4 PROTECTION
A. Dissimilar Metals: When aluminum materials are in contact with or fastened to dissimilar metals, with the exception of stainless steel or zinc, cover the contact surface of the dissimilar metal with 1-layer of 30-pound roofing felt.

B. Masonry or Plaster: When aluminum materials are in contact with or built into masonry or plaster, cover with a heavy brush coat of alkali-resistant bituminous paint or clear methacrylate lacquer.

C. Wood:
   1. When aluminum materials are in contact with green or wet wood, or any other absorptive material subjected to repeated wetting, or treated wood with a non-compatible preservative, cover the contact surfaces with 1-layer of 30-pound roofing felt.
   2. Seal joints with approved caulking material.
Roofing Compliance Certification

Provide with shop drawings, original, embossed, professional engineer’s seal on this bid form attesting that the system proposed complies with all specified performance criteria of the metal roof specification 07400 and structural requirements, as follows:

Product: ___________________________ Engineer’s Initials

2.2.A Materials Product Verified in Compliance
2.2.D.1 Structural Product Verified in Compliance
2.2.D.2 Design Product Verified in Compliance
2.2.D.3 Weathertightness Product Verified in Compliance
2.2.D.4 Resistance to Wear Through Product Verified in Compliance
2.2.D.5 Factory Color Finish Product Verified in Compliance
2.3.A Panel Clips Product Verified in Compliance
2.3.B Fasteners Product Verified in Compliance
3.2.A Structural Design Loads Product Verified in Compliance
3.2.B Concentrated Load Test Product Verified in Compliance
3.2.C Thermal Movement Product Verified in Compliance
3.2D Factors of Safety Product Verified in Compliance

As a registered Professional Engineer in the State of __________, I do hereby certify that I have reviewed the contract documents and the standing seam metal roof panel system intended for application on this project and found it to be in full compliance with the performance criteria established by the specifications, without exception. All certified test reports and calculations substantiating the specified performance will be sealed under my auspices at submittal time.

Name: ____________________________ Reg #____________ State: ______________

Seal

END OF SECTION